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NOTES ON THE LIFE HISTORY OF THE MOSSES.

THE great majority of mosses mature their fruit in autumn or winter so that the spores are ready for germination in the spring as soon as the proper conditions of moisture and temperature arrive. When this time comes, the spores, which have been scattered by the wind and the jostling of small animals, burst their brown coats and send out delicate threads (fig. 2). These threads are of two kinds, those that are at the surface of the substratum such as those of the slender *Pogonatum* (fig. 1); these form the protonema, a tangle of green threads that might easily be mistaken for Algæ. Those which grow down beneath the surface are called rhizoids and serve the purpose of roots. This distinction between protonema and rhizoid is more apparent than real as each may develop the other and very often does so.

The protonema goes on growing like an Alga for a considerable time until it has reached the proper stage of development, when the first moss bud is formed (fig. 3), on some favorable portion of the protonema by the repeated division of a single unfertilized cell. Thus it will be seen that the whole moss plant thus far and including the protonema corresponds to the prothallium of the fern.

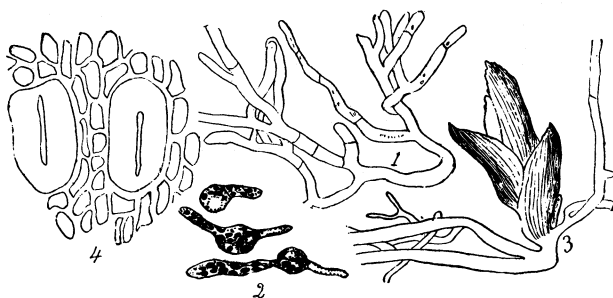


Fig. 1—Protonema of *Pogonatum tenue*. Fig. 2—Germinating moss spore (After Goebel). Fig. 3—Young moss plant starting from protonema. Fig. 4—Stomata and cells of base of outer (exothecial) wall of capsule of *Polypodium commune*. Figs. 2 and 4 are magnified about twice as much as 1 and 3.

As no doubt our readers all know, the ferns have what is called an alternation of generations, the prothallium representing one

generation, the sexual, so-called because of the fertilization of the archegonia by the antherozoids. The spore bearing fern is called the asexual generation because the spores are formed by simple cell division without fertilization. The capsule and seta of the moss correspond to this asexual generation of the fern.

The great difference between the moss and the fern lies in the fact that in the fern the sexual generation (gametophyte), merely serves as a starting point for the young fern, while in the case of the moss it persists and nourishes the asexual generation (sporophyte), throughout its life and in many cases persists for years, sending up a new sporophyte each year.

In most of the mosses, however, the sporophyte has begun to take care of itself. Referring to Fig. 3 of our last issue, a small knob, the apophysis or better the hypophysis, will be seen at the base of the capsule. If we divide the capsule longitudinally we shall find that the spore case does not extend to the hypophysis, but the base of the capsule just above it consists of a loose mass of cellular tissue. The walls of this part of the capsule are pierced by numerous stomata (Fig. 4), much like those of the epidermis of the under side of plant leaves and serving the same purposes.

NEW OR RARE MOSSES.

I.—ANACAMPTODON SPLACHNOIDES (Frölich) Brid.

THIS moss, though rare, has an extensive range, being known from Central and Southern Europe, and the Caucasian mountains, as well as from the mountainous regions of the Eastern United States. Although small, and rarely found except in small quantities, it is easily recognized by its dark green velvety appearance and usually abundant fruit, which is so distinctive a character that it has given both the generic and specific names to this species. The generic name refers to the teeth which are bent backward, and the specific name indicates its resemblance to the *Splachnum*, on account of the contraction below the mouth, which is so noticeable in the older capsules. Besides its unmistakable appearance, this moss has also a peculiar habit, by which it may be looked for and always recognized when found. It always grows around the edges of cavities in trees, where water stands, such as old knot-holes, in the forks of branches, and even on blazed surfaces and scars,